Claims:

1. An electrolytic capacitor comprising: an electrode employing one type of an alloy selected from a group consisting of niobium alloy, titanium alloy, and tungsten alloy; wherein a dielectric layer is formed on a surface of the electrode by anodizing the electrode.

2. The electrolytic capacitor as claimed in Claim 1, wherein the niobium alloy employed as the electrode is formed by alloying niobium with at least one type of additive metal selected from a group consisting of tungsten, vanadium, zinc, aluminum, molybdenum, hafnium, and zirconium.

3. The electrolytic capacitor as claimed in Claim 2, wherein the niobium alloy employed as the electrode contains aluminum, and the dielectric layer formed on a surface of the electrode contains niobium oxide and aluminum oxide.

4. The electrolytic capacitor as claimed in Claim 1, wherein the titanium alloy employed as the electrode is formed by alloying titanium with at least one type of additive metal selected from a group consisting of tungsten, vanadium, zinc, aluminum, molybdenum, hafnium, and zirconium.

5. The electrolytic capacitor as claimed in Claim 1, wherein the tungsten alloy employed as the electrode is

formed by alloying tungsten with at least one type of additive metal selected from a group consisting of niobium, titanium, tantalum, vanadium, zinc, aluminum, molybdenum, hafnium, and zirconium.

6. The electrolytic capacitor as claimed in Claim 1, wherein the additive metal content of each alloy is in the range of 0.01 to 10 wt%.

7. An electrolytic capacitor comprising: an electrode of mixed sinter of niobium and aluminum, made by sintering mixed powder of niobium and aluminum; wherein a dielectric layer containing niobium oxide and aluminum oxide is formed on a surface of the electrode by anodizing the electrode.

8. The electrolytic capacitor as claimed in Claim 7, wherein the amount of aluminum to the total amount of niobium and aluminum is in the range of 0.01 to 10 wt%.

9. An electrolytic capacitor comprising: an electrode of fluorine-doped niobium or niobium alloy; and a dielectric layer formed on a surface of the electrode by anodizing the electrode.

10. The electrolytic capacitor as claimed in Claim 9, wherein the dielectric layer contains niobium fluoride.

11. A fabrication method for electrolytic capacitor comprising the steps of: doping fluorine in an electrode by heat-treatment in fluorine gas atmosphere; and forming a

dielectric layer on a surface of the electrode by anodizing the electrode.

12. The fabrication method for electrolytic capacitor as claimed in Claim 11, wherein the temperature of the heat-treatment is not higher than 200 ℃.

13. A fabrication method for electrolytic capacitor comprising the step of anodizing an electrode in aqueous solution containing fluorine ion that makes fluorine doped in the electrode of niobium or niobium alloy and a dielectric layer formed on a surface of the electrode by anodizing the electrode.

14. The fabrication method for electrolytic capacitor as claimed in Claim 13, wherein the aqueous solution of fluorine ion contains at lest one kind of fluoride selected from the group consisting of ammonium fluoride, potassium fluoride, sodium fluoride, and fluoric acid.